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RESEARCH ARTICLE

Trends and biases in scientific literature about marmosets, genus Callithrix (Primates, Callitrichidae): biodiversity and conservation perspectives

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Abstract

Marmosets of the genus *Callithrix* are small-bodied platyrrhines, endemic to Brazil. In the last 30 years, there has been a constant interest in studying their biology, ecology and conservation. In this study, we compiled a systematic review to evaluate the trends and advances of marmoset research, from biodiversity and conservation perspectives. We searched for articles published in peer-reviewed journals within the main academic search engines, using the keywords "marmoset" OR "sagui" OR "*Callithrix*". We found 68 published articles with a focus on biodiversity and conservation. The number of articles has increased over the years, most of them consisting of research from the Atlantic Forest biome. *Callithrix penicillata* (26 articles) and *C. jacchus* (21) were the most studied species. The number of studies was associated with the species' geographical distribution. From a conservation perspective, the most threatened species showed the narrowest geographical distribution, a lower number of stud-

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ies and, on average, a smaller protected area size. We concluded that trends and biases in biodiversity and conservation scientific literature of *Callithrix* are directly and indirectly associated with its geographical distribution. Species with wide geographical distribution are more studied, better known and protected. We highlight that the major effort of studies must be towards marmoset populations from the transition region of the Atlantic Forest-Cerrado and Caatinga biomes, and on threatened species within narrow geographical ranges.

Resumo

Saguis do gênero *Callithrix* são platyrrhines de corpo pequeno, endêmicos para o Brasil. Nos últimos 30 anos, tem havido um interesse constante em estudar sua biologia, ecologia e conservação. Neste estudo, compilamos uma revisão sistemática para avaliar as tendências e avanços da pesquisa de saguis, a partir de uma perspectiva de biodiversidade e conservação. Procuramos artigos publicados em periódicos revisados por pares dentro dos principais mecanismos de busca acadêmicos, utilizando as palavras-chave "marmoset" OU "sagui" OU "*Callithrix*". Encontramos 68 artigos publicados com foco na biodiversidade e conservação. O número de artigos aumentou ao longo dos anos, a maioria deles tendo sido realizada no domínio da Mata Atlântica. *Callithrix penicillata* (26 artigos) e *C. jacchus* (21) foram as espécies mais estudadas. O número de estudos esteve associado à distribuição geográfica das espécies. Do ponto de vista da conservação, as espécies mais ameaçadas apresentaram distribuição geográfica mais estreita, menor número de estudos e, em média, menor tamanho de área protegida. Concluímos que tendências e vieses na literatura científica sobre os estudos de biodiversidade e conservação de *Callithrix* estão direta e indiretamente associados à sua distribuição geográfica. Espécies com ampla distribuição geográfica são mais estudadas, mais conhecidas e protegidas. Ressaltamos que o maior esforço de estudos deve estar voltado para populações de saguis na região de transição de Mata Atlântica-Cerrado e Caatinga, e espécies ameaçadas com distribuição geográfica restrita.

Keywords

Atlantic Forest, *Callithrix flaviceps*, *Callithrix penicillata*, geographic distribution, scientometrics

Palavras-chave

Callithrix flaviceps, *Callithrix penicillata*, cienciometria, distribuição geográfica, Mata Atlântica

Introduction

It has been proposed that two scientific milestones explain a considerable increase in the number of Neotropical Primate species in the past 30 years: A shift towards the phylogenetic species concept and the inclusion of cytogenetic and molecular analyses in taxonomy and systematics (Rylands et al. 2011). Both aspects were fundamental to the current proposal of dividing the marmosets (subfamily Callithrichinae) into three genera: *Callithrix*, *Cebuella* and *Mico*, with 21 recognized species (Garbino 2015). The genus *Callithrix* (hereafter called "marmosets") is composed of six species, all endemic to Brazil: *C. aurita* (É. Geoffroy, 1812), *C. flaviceps* (Thomas, 1903), *C. geoffroyi* (Humboldt, 1812), *C. jacchus* (Linnaeus, 1758), *C. kuhlii* (Coimbra-Filho, 1985) and *C. penicillata* (É. Geoffroy, 1812). *Callithrix aurita*, *C. flaviceps* and *C. kuhlii* occur exclusively in the Atlantic Forest (Rylands et al. 1993; IUCN 2018). Although *C. geoffroyi*'s distribution is considered endemic to

the Atlantic Forest, this is contested by trustworthy registers from Cerrado localities in Minas Gerais where they have been recorded since the 1940s (Silva et al. 2018). The common marmoset, *C. jacchus*, is originally endemic to the Caatinga (Schiel and Souto 2016), and *C. penicillata* presents a broad distribution along the Atlantic Forest, Cerrado and Caatinga (Paglia et al. 2012; IUCN 2018). Marmosets display a wide ecological plasticity, occurring in all types of forests, as well as in degraded environments and urban areas (Castro 2003; Rodrigues and Martinez 2014). Nevertheless, according to the International Union for Conservation of Nature (IUCN 2018), the *Callithrix* species show a different conservation status. *Callithrix jacchus* and *C. penicillata* are classified as least concern (LC) by the IUCN (2018), being the most common introduced primates throughout Brazil (Oliveira and Pereira 2010). On the other hand, *C. aurita* and *C. flaviceps* are respectively classified as vulnerable (VU) and endangered (EN), with populations threatened by factors such as invasive species and pervasive loss of original habitat (IUCN 2018).

Marmosets use plant exudates as an important component of their diet (Sussman and Kinzey 1984; Garbino 2015). Additionally, they feed on fruits, flowers, seeds, nectar, insects, mollusks, bird eggs and small vertebrates (Bicca-Marques et al. 2011; Pinheiro and Pontes 2015). Several studies regarding the diet and activity patterns of different species of *Callithrix* have been published in the past 30 years (Lacher et al. 1984; Passamani 1998; Vilela and Faria 2004; Raboy et al. 2008; Vilela and Del-Claro 2011; Pinheiro and Pontes 2015; Silvestre et al. 2016). Nevertheless, there is a lack of information on the trends and biases in the marmoset scientific literature. This information is relevant to decision making and public policies for conservation of the threatened species and management of the invasive ones. Therefore, we have performed a systematic review to evaluate the trends and advances of marmoset research, from a biodiversity and a conservation perspective. We described the tendencies in the number of articles per year of publication, per biome, per species and per species geographical distribution. We also investigated the conservation status of marmosets through the changes in their Red List category, and how many protected areas are used for conservation of each species.

Material and methods

Data source

We searched for articles about *Callithrix* in Google Scholar (https://scholar.google.com.br), Scielo (https://www.scielo.org), Scopus (https://www.scopus.com) and Web of Science (WoS, https://apps.webofknowledge.com) databases for the whole time series available in each database. The following keywords were used: "Callithrix" OR "marmoset" OR "sagui" in the articles' titles, abstracts and keywords. Later, we manually checked this result to select articles in biodiversity and conservation, ranging within the following areas: animal behavior, conservation, ecology and zoology. We considered only articles using the current *Callithrix* taxonomy as

presented on the Annotated Checklist of Brazilian Mammals (Paglia et al. 2012) and International Union for Conservation of Nature and Natural Resources (IUCN 2018). For each article, we identified: 01) the species of *Callithrix*; 02) the year of publication; 03) the biomes of the study (Atlantic Forest, Caatinga and Cerrado), based on the map of biomes and vegetation of Brazil (IBGE 2004). We also correlated the number of articles with the geographical distribution of each *Callithrix* species. For this, we downloaded the mammal shapefile data available from the International Union for Conservation of Nature (IUCN 2018), and refined this to the six *Callithrix* species geographical distribution, using the QGIS software v.2.18 (QGIS Development Team 2015, Suppl. material 1: Figure S1).

Regarding *Callithrix* conservation, we searched for previously published Red List assessments to show changes in each species' conservation category. We also visited the conservation action sub-session on the IUCN home page to verify the number and average size of protected areas for each marmoset species (IUCN 2018).

Data analysis

For trends and biases of *Callithrix* studies, we associated the number of articles with: year of publication, biomes, *Callithrix* species and *Callithrix* geographical distribution. We tested the relationship between the number of articles (response variable) with the year of publication and the geographical distribution – km^2 (predictive variable) using the Pearson correlation test. To test the association between the average size of protected areas (response variable) with any given marmoset species (explanatory variable), we used the analysis of variance (ANOVA) through the 'aov' function and a Tukey post-hoc test through the 'tukeyHSD' function to compare differences between each *Callithrix* species. Previously, the size of protected area was log (x + 1) transformed to standardize the great variance of the data. Normality and homogeneity were tested using the Shapiro-Wilk normality test through the 'shapiro.test' function ($W = 0.983$, $P = 0.412$) and Levene's test for homogeneity of variance through 'leveneTest' function ($F = 0.513$, $P = 0.764$) executed by '*car*' package (Fox and Weisberg 2011). All statistical analyses were performed using the R program (R Development Core Team 2013).

Results

We found 68 articles (Suppl. material 2: Table S2) about biodiversity and/or conservation of *Callithrix* species in Brazil. The first article was published in 1984. The number of articles increased over years ($\rho = 0.66$, $df = 19$, $P = 0.001$, Fig. 1A). Most articles were about the Atlantic Forest species (47 articles, Fig. 1B), with *Callithrix penicillata* (n = 26 articles) and *C. jacchus* (n = 21) as the most studied (Fig. 1C). The number of articles was associated with the geographical distribution ($\rho = 0.98$, $df = 4$, $P = 0.0005$, Fig. 1D).

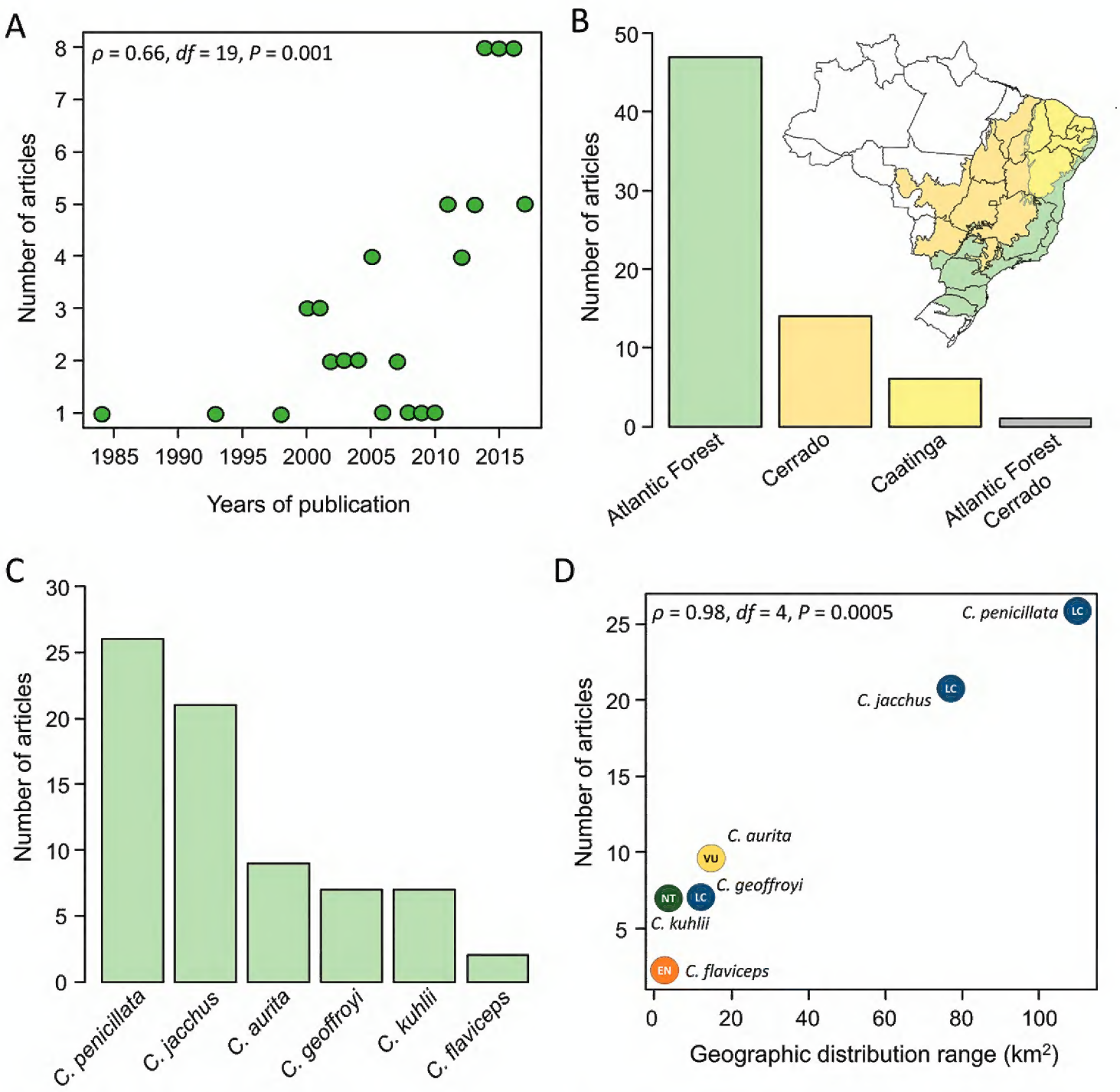

Figure 1. Trends and biases in the number of articles published about *Callithrix* species regarding: **A)** Years of publications, **B)** Brazilian biomes, **C)** *Callithrix* species, **D)** *Callithrix* geographical distribution.

Callithrix penicillata and *C. jacchus* have the broadest geographical distribution, occurring in the Atlantic Forest, Caatinga and Cerrado (Suppl. material 1: Figure S1, Fig. 1D). Both species are classified as least concern (LC) by the IUCN classification (Fig. 2A). On the other hand, *C. flaviceps* and *C. kuhlii* have the narrowest geographical distribution, occurring exclusively on the Atlantic Forest (Suppl. material 1: Figure S1, Fig. 1D), and are respectively classified as endangered (EN) and near threatened (NT), according to the IUCN (Fig. 2A). *Callithrix aurita* is a vulnerable species (VU), and *C. geoffroyi* was considered vulnerable until the year 2000, when it was reclassified as LC (Fig. 2A). We found a significant difference (F-value = 3.669; $P = 0.005$) between average protected area sizes for *Callithrix* species, mainly between the endangered *C. flaviceps* and the least concern *C. penicillata* (Fig. 2B).

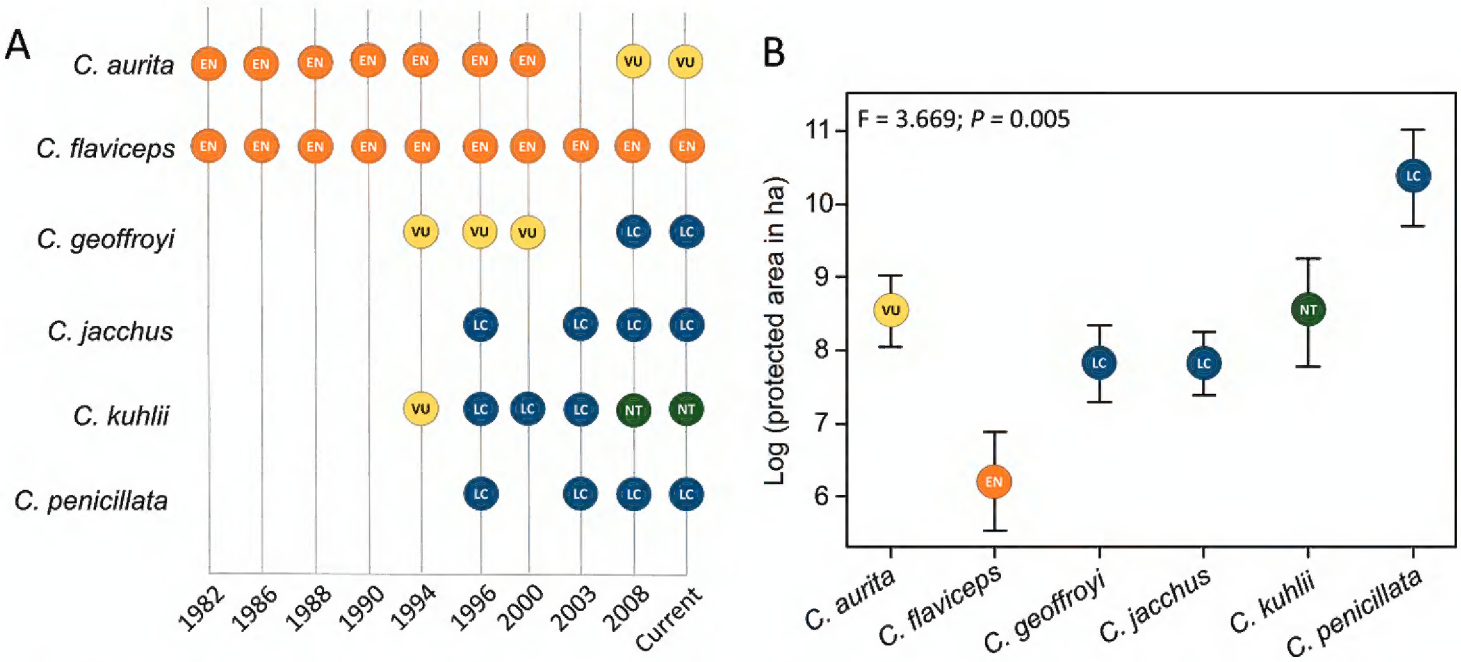

Figure 2. Trends and biases of conservation status of *Callithrix* species. **A)** Change in category of threat through time scale; **B)** Mean and standard error of conservation areas of the *Callithrix* species. Legend: EN=endangered, VU=vulnerable, NT=near threatened, LC=least concern.

Discussion

The past 30 years have shown an increase in articles written on *Callithrix* studies, approximately 15 years after the first study. Since 2006, the number of articles has more than doubled in each passing year. The temporal trends of the number of articles published have been reported for different groups, i.e. Euphorbiaceae (Pereira et al. 2018) and zooplankton community (Souza et al. 2018); even from a biome perspective (Borges et al. 2015). Even though more articles have been published each year, there is not an even distribution throughout the distribution of the genus, but rather a notable concentration along the Atlantic Forest. This pattern can be explained directly and indirectly by marmoset geographical distribution. First, all marmosets occur in the Atlantic Forest, with three of them endemic to this biome (Paglia et al. 2012; IUCN 2018; Suppl. material 1: Figure S1). An abundance of studies in the Atlantic Forest could also be explained because southeastern Brazil, along with the states of Bahia and Rio Grande do Sul, concentrate the highest number of tenured faculty positions for all sciences, along with graduate programs in biology and related areas (GEOCAPES 2016; Massarani and Moreira 2016), resulting in research networks and investments that drive the growth of science.

The relation between the number of articles and marmoset species also responds directly and indirectly to geographical distribution. *Callithrix penicillata* and *C. jacchus*, which have the largest geographical ranges of the genus (IUCN 2018), are common species (Oliveira and Pereira 2010) that may overlap their home range with private properties, and are habituated to human presence (Valença-Silva et al. 2014). Hence, common and broadly distributed species have more chance to be studied than uncommon species or species with narrow geographical distribution (see, Fig. 1D). Although *Callithrix aurita* has a small geographical distribution compared to the two other endemics, it occurs in northwestern São Paulo, southeastern

Minas Gerais and within the entire state of Rio de Janeiro, an area of intense concentration of research centers (GEOCAPES 2016; Massarani and Moreira 2016). In this sense, we highlight that more studies should be focused on species that present narrow geographical distribution, such as *C. flaviceps* and *C. kuhlii*, which are endangered and near threatened, respectively (IUCN 2018).

Shifts on the Red List assessments have also affected protection for *Callithrix* species. Until 1994, four *Callithrix* species were considered threatened. Currently, only *C. flaviceps* and *C. aurita* are endangered and vulnerable, respectively, with decreasing population trends driven by areas of extreme forest fragmentation through agriculture, cattle ranching, tree monocultures (*Eucalyptus*), urbanization, mining, and pet hunting (Rylands et al. 2008a, b). *Callithrix flaviceps* deserves special attention because its protected habitat size is the smallest of all marmosets (Suppl. material 1: Figure S1). Protected areas play a useful role in conserving endangered species that occur within them; nevertheless, considering the current scenario of habitat loss and fragmentation, conservation strategies along with agricultural and urban land-use planning outside formally protected areas are needed (Deguise and Kerr 2006). We believe this strategy should be used for marmoset conservation.

The analysis of scientific production was important to reveal a broad range of studies on the genus *Callithrix*. We also found the need for further research in the Caatinga and Cerrado biomes, although there is an important volume of knowledge for certain populations of *C. jacchus* and *C. penicillata*. Some species endemic to the Atlantic Forest, such as *C. flaviceps* and *C. kuhlii*, need more attention, considering their IUCN status. The trends observed can be justified not by the species distribution, abundance or conservation importance, but by the distribution of the main research groups and graduate programs in Brazil, concentrated on the southeastern Atlantic Forest (Massarani and Moreira 2016). Therefore, a shift in the geographical focus of research is needed to increase conservation and biodiversity knowledge of the most endangered species of this versatile and charismatic genus.

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References

Bicca-Marques JC, Silva VM, Gomes DF (2011) Ordem Primates. In: Reis NR, Peracchi AL, Pedro WA, Lima IP (Eds) Mamíferos do Brasil. Nélio R. dos Reis, Londrina, 107–150.

Borges PP, Oliveira KFA, Machado KB, Vaz UL, Cunha HF, Nabout JC (2015) Trends and gaps of the scientific literature on the Cerrado biome: A scientometric analysis. Neotropical Biology and Conservation 10(1): 2–8. https://doi.org/10.1590/1676-0611-bn-2017-0426

Castro CSS (2003) Tamanho da área de vida e padrão de uso do espaço em grupos de saguis, *Callithrix jacchus* (Linnaeus) (Primates, Callithrichidae). Revista Brasileira de Zoologia 20(1): 91–96. https://doi.org/10.1590/S0101-81752003000100011

Deguise IE, Kerr JT (2006) Protected areas and prospects for endangered species conservation in Canada. Conservation Biology 20(1): 48–55. https://doi.org/10.1111/j.1523-1739.2005.00274.x

Fox J, Weisberg S (2011) An {R} Companion to Applied Regression. Sage, Thousand Oaks, 472 pp. http://socserv.mcmaster.ca/jfox/Books/Companion

Garbino GST (2015) How many marmoset (Primates: Cebidae: Callithrichinae) genera are there? A phylogenetic analysis based on multiple morphological systems. Cladistics 31(6): 1–17. https://doi.org/10.1111/cla.12106

Geocapes (2016) Sistema de informações georreferenciais. http://geocapes.capes.gov.br/ [Accessed on 20.06.2018]

IBGE (2004) Mapa de Bioma e de Vegetação. https://www.ibge.gov.br/ [Accessed on 20.06.2018]

IUCN (2018) The IUCN Red List of Threatened Species. http://www.iucnredlist.org/ [Accessed on 20.06.2018]

Lacher TE, Fonseca GAB, Carlos A, Castro BM (1984) Parasitism of trees by marmosets in a Central Brazilian gallery forest. Biotropica 16(3): 202–209. https://doi.org/10.2307/2388053

Massarani L, Moreira IC (2016) Science communication in Brazil: A historical review and consideration about the current situation. Anais da Academia Brasileira de Ciências 88(3): 1577–1595. https://doi.org/10.1590/0001-3765201620150338

Oliveira AES, Pereira DG (2010) Erradicação de espécies exóticas invasoras: Múltiplas visões da realidade brasileira. Desenvolvimento e Meio Ambiente 21: 173–181. https://doi.org/10.5380/dma.v21i0.14618

Paglia AP, Fonseca GAB, Rylands AB, Herrmann G, Aguiar LMS, Chiarello AG, Leite YLR, Costa LP, Siciliano S, Kierulff MCM, Mendes SL, Tavares VC, Mittermeier RA, Patton JL (2012) Lista Anotada dos Mamíferos do Brasil/Annotated Checklist of Brazilian Mammals. Conservation International, Arlington, 76 pp.

Passamani M (1998) Activity budget of geoffroy's marmoset (*Callithrix geoffroyi*) in an Atlantic Forest in southeastern Brazil. American Journal of Primatology 46(4): 333–340. https://doi.org/10.1002/(SICI)1098-2345(1998)46:4<333::AID-AJP5>3.0.CO;2-7

Pereira IR, D'Abadia PL, Prado ADL, Matos FS, Nabout JC, Gonçalves PJ, Almeira LM (2018) Trends and gaps in the global scientific literature about *Jatropha curcas* L. (Euphorbiaceae), a tropical plant of economic importance. Semina. Ciências Agrárias 39(1): 7–18. https://doi.org/10.5433/1679-0359.2018v39n1p7

Pinheiro HLN, Pontes ARM (2015) Home range, diet, and activity patterns of common marmosets (*Callithrix jacchus*) in very small and isolated fragments of the Atlantic Forest of Northeastern Brazil. International Journal of Ecology 2015: 1–13. https://doi.org/10.1155/2015/685816

QGIS Development Team (2015) QGIS Geographical Information System. Open Source Geospatial Foundation Project. http://qgis.osgeo.org/ [Accessed on 20.06.2018]

R Development Core Team (2013) R A Language and Environment for Statistical Computing. R Foundation for Statistical Computing. http://www.R-project.org/ [Accessed on: 20.06.2018]

Raboy BE, Canale GR, Dietz JM (2008) Ecology of *Callithrix kuhlii* and a review of Eastern Brazilian marmosets. International Journal of Primatology 29(2): 449–467. https://doi.org/10.1007/s10764-008-9249-6

Rodrigues NN, Martinez RA (2014) Wildlife in our backyard: interactions between Wied's marmoset *Callithrix kuhlii* (Primates: Callithrichidae) and residents of Ilhéus, Bahia, Brazil. Wildlife Biology 20(2): 91–96. https://doi.org/10.2981/wlb.13057

Rylands AB, Coimbra-Filho AF, Mittermeier RA (1993) Systematics, distributions, and some notes on the conservation status of the Callitrichidae. In: Rylands AB (Ed.) Marmosets and Tamarins: Systematics, Behaviour, and Ecology. Oxford University Press, 11–77.

Rylands AB, Kierulff MCM, Mendes SL (2008a): *Callithrix aurita*. The IUCN Red List of Threatened Species 2008: e.T3570A9949843. https://doi.org/10.2305/IUCN.UK.2008.RLTS.T3570A9949843.en[Accessed on 20.06. 2018]

Rylands AB, Ferrari SF, Mendes SL (2008b) *Callithrix flaviceps*. The IUCN Red List of Threatened Species 2008: e.T3571A9951402. https://doi.org/10.2305/IUCN.UK.2008.RLTS.T3571A9951402.en[Accessed on 20.06. 2018]

Rylands AB, Mittermeier RA, Silva Jr JS (2011) Neotropical primates: Taxonomy and recently described species and subspecies. International Zoo Yearbook 46(1): 11–24. https://doi.org/10.1111/j.1748-1090.2011.00152.x

Schiel N, Souto A (2016) The common marmoset: An overview of its natural history, ecology and behavior. Developmental Neurobiology 77(3): 244–262. https://doi.org/10.1002/dneu.22458

Silva FFR, Malukiewincz J, Silva LC, Carvalho RS, Ruiz-Miranda CR, Coelho FAS, Figueira MP, Boere V, Silva IO (2018) A Survey of Wild and Introduced Marmosets (Callithrix: Callitrichidae) in the Southern and Eastern Portions of the State of Minas Gerais, Brazil. Primate Conservation 32: 1–18. http://static1.1.sqspcdn.com/static/f/1200343/28066372/1548526037913/PC32_Silva_et_al_Marmosets_in_Minas_Gerais.pdf?token=avtsPMTlgPIWJiFhfWkbzMLwOBw%3D

Silvestre SM, Dantas JO, Rocha PA, Mendes RB, Ferrari SF (2016) Faecal analysis as a complementary approach to the study of feeding ecology in the common marmoset (*Callithrix jacchus* LINNAEUS, 1758). Mastozoolgía Neotropical 23(1): 185–191. http://www.redalyc.org/articulo.oa?id=45746645020

Souza CA, Gomes LF, Nabout JC, Velho LFM, Vieira LCG (2018) Temporal trends of scientific literature about zooplankton community. Neotropical Biology and Conservation 13(4): 274–286. https://doi.org/10.4013/nbc.2018.134.01

Sussman RW, Kinzey WG (1984) The ecological role of the Callithrichidae: A review. American Journal of Physical Anthropology 64(4): 419–449. https://doi.org/10.1002/ajpa.1330640407

Valença-Silva G, Maciel FG, Zaganini RL, Lucindo AS, Caramaschi S, Paula HMG (2014) Reporting social behaviours of mixed-species troops formed by *Callithrix jacchus* and *Callithrix penicillata* (Primate, Callithrichidae). Brazilian Journal of Biology 74(3): 607–611. https://doi.org/10.1590/bjb.2014.0091

Vilela AA, Del-Claro K (2011) Feeding behavior of the black-tufted-ear marmoset (*Callithrix penicillata*) in a tropical Cerrado savanna. Sociobiology 58(2): 1–6. http://www.leci.ib.ufu.br/pdf/Vilela%20e%20del%20claro.pdf

Vilela SL, Faria DS (2004) Seasonality of the activity pattern of *Callithrix penicillata* (Primates, Callitrichidae) in the Cerrado (scrub savanna vegetation). Brazilian Journal of Biology 64(2): 363–370. https://doi.org/10.1590/S1519-69842004000200023

Supplementary material 1

Figure S1. Map showing the geographical distribution of *Callithrix* species according to International Union for Conservation of Nature (IUCN 2018)

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Data type: occurrence

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Supplementary material 2

Table S2. List of articles approaching biodiversity and/or conservation of *Callithrix* species

Authors: Wellington Hannibal, Polla Renon, Valquiria Vilalba Figueiredo, Roniel Freitas Oliveira, Antonio Eduardo Moreno, Romari Alejandra Martinez

Data type: reference data

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